and quenching station **14** to the additional cooling station **16**. FIG. 8 shows how the fingers **102** support the bent glass G for removal from station **14**.

When limit switch LS–3 is engaged, it deactivates the pistons **100**, thereby permitting them to retract the fingers **102**. This action deposits the bent glass sheets onto the conveyor rolls **23** of the third conveyor section **22**. At the same time, limit switch LS–3 actuates a timer T–6 that energizes the motor drive **111** in reverse until the shuttle car **90** is in position at the shaping and quenching station **14** with its fingers **102** retracted, but capable of alignment with the notches **43** and **53** of the shaping molds **40** and **50** upon extension.

The timer T–6 also resets all the limit switches and timers so that they can be actuated in the sequence recited above during a succeeding cycle. In addition, timer T–6 opens solenoid valves SV–1 and SV–2 to permit heated gas to enter mold chambers **42** and **52** to raise the mold temperatures to the desired temperature range. The rate of flow is again preferably between 300 and 350 cubic feet per minute of the combustion products of natural gas per square foot of mold shaping surface. This rate suffices to raise the molds to the desired temperature range of 600 to 750 degrees Fahrenheit without wasting excess combustion products.

It is understood that the present invention may be used in horizontal pressing apparatus comprising one mold of the type depicted by convex mold **40** in combination with an open ring type mold. Preheating a foraminous mold to the proper temperature range causes equal heat exchange along opposite major glass sheet surfaces even though one mold is continuous and the other of the open ring type.

Several experiments were performed to determine optimum parameters for quenching pressed glass sheets. In these experiments, apertures **67** were arranged in parallel rows ½ inch apart. The apertures in each row were ⅛ inch diameter spaced ½ inch apart center to center and the rows were skewed at a 15 degree angle to the axis of relative movement between the glass sheet and the press bending molds.

The following parameters listed in Table I were verified as the minimum quenching times and minimum displacement at 60 cycles of reciprocation per minute to establish an acceptable temper in the glass previously heated to 1220 degrees Fahrenheit before being press bent and quenched (one in which the glass developed a surface compression stress of at least 22,000 pounds per square inch).

TABLE I

Glass	Nominal thickness, inches	Mold to mold separation, inches	Minimum acceptable displacement, inches	Minimum time to produce acceptable temper, seconds
Sheet	⅛	.45	⅝	5
Sheet	3/16	.55	⅝	7
Plate	¼	.65	⅝	9

Previous work on glass tempering had indicated that commercial soda-lime-silica composition of sheet glass, plate glass and float glass had insignificant differences from one another in parameters for identical thicknesses, heating cycles, nozzle or aperture configurations, mold to mold separation during quenching, rate of cold air flow and displacement during relative oscillation between the bent glass and the apertured molds during quenching.

The form of the invention shown and described in this disclosure represents an illustrative preferred embodiment thereof. It is understood that various changes may be made without departing from the spirit of the invention as defined in the claimed subject matter which follows. For example, an operative apparatus may have only the lower mold **40** movable vertically instead of moving both molds of the illustrative horizontal press bending apparatus.

What is claimed is:

1. A method of shaping and cooling a glass sheet disposed in a generally horizontal position at a desired location,

press shaping said sheet to a desired curvature at said location with opposing foraminous surfaces,

moving at least one of said foraminous surfaces to separate said foraminous surfaces, said glass sheet remaining in contact with one of said foraminous surfaces,

applying heated fluid through said foraminous surface in contact with said glass sheet at a pressure sufficient to separate said glass sheet from said foraminous sheet in contact therewith, and

applying chilling medium through each of said foraminous surfaces to said glass sheet at a pressure sufficient to support said glass sheet and until said glass sheet is no longer in a deformable state.

2. A method of shaping and cooling a glass sheet at a location in a generally horizontal path through which said glass sheet is conveyed comprising

moving said sheet into said location,

press shaping said sheet to a desired curvature at said location with opposing foraminous surfaces,

moving at least one of said foraminous surfaces to separate said foraminous surfaces, said glass sheet remaining in contact with one of said foraminous surfaces,

applying heated air through said foraminous surface in contact with said glass sheet at a pressure sufficient to separate said glass sheet from said foraminous surface in contact therewith, and

applying cool air through each of said foraminous surfaces to said glass sheet at a pressure sufficient to support said glass sheet and until said glass sheet is no longer in a deformable state.

3. Apparatus for bending and cooling glass sheets, comprising a press shaping mold and a light weight frame at a single station, a pair of sets of fingers fixed to said frame for movement therewith, each finger of one set being spaced from a finger of the other set by a distance slightly greater than the glass sheet dimension along a line connecting said fingers, means supporting said frame relative to said mold, and means to impart a to-and-fro motion to said frame in a generally horizontal direction and along an axis parallel to said line connecting said fingers, whereby when a bent glass sheet is supported adjacent a shaping surface of said mold, said fingers alternately engage opposite edges of said supported glass sheet to impart a generally horizontal to-and-fro motion to said supported glass sheet until said glass sheet is cooled and is no longer in a deformable state.

4. Apparatus as in claim **3**, comprising a pair of press shaping mold members, each mold member having a plenum chamber and an outer, foraminous wall having a contour conforming to the shape desired for the major surface of a glass sheet it opposes during press bending, means for introducing cold fluid into said chamber for exhaust through said foramina at a rate sufficiently rapid to impart a temper to said glass sheet after the latter is shaped to its desired contour, and means to actuate said to-and-fro motion of said frame in synchronism with the introduction of cold fluid into said chambers.

5. Apparatus as in claim **4**, wherein said molds include one mold having a foraminous wall of concave contour and another mold having a foraminous wall of convex contour and means providing relative movement between said contoured walls between a retracted position and a closed position.

6. Apparatus as in claim **5**, further including control means for introducing fluid into the chamber of said mold having a foraminous wall of convex contour only upon providing relative movement of said molds from said